Unemployment Analysis in Pakistan (1991–2024)

Introduction

This project analyzes unemployment rate trends in Pakistan from 1991 to 2024.

Objectives:

- Understand long-term unemployment trends.
- Investigate the impact of COVID-19.
- Compare youth vs total unemployment rates.
- Identify patterns for economic policy.

```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

df = pd.read_csv("pakistan_unemployment_1991_2024.csv")
df.head()
```

	year	unemployment_rate_total	unemployment_rate_youth
0	1991	6.3	NaN
1	1992	5.0	NaN
2	1993	4.7	NaN
3	1994	4.8	NaN
4	1995	5.4	NaN

Dataset Information

- **year** – Year of observation
- **unemployment_rate_total** – % of total labor force unemployed
- **unemployment_rate_youth** – % of youth (15–24) unemployed

```
df.describe()
```

	year	unemployment_rate_total	unemployment_rate_youth
count	34.000000	34.000000	6.000000
mean	2007.500000	6.161765	10.320000
std	9.958246	0.961380	0.605277
min	1991.000000	4.700000	9.710000
25%	1999.250000	5.500000	9.777500
50%	2007.500000	6.000000	10.330000
75%	2015.750000	6.300000	10.800000
max	2024.000000	8.300000	11.000000

```
# Checking for missing values and if tehre is missing values we'll fill those with "No data"
df.isnull().sum()
```

```
year                       0
unemployment_rate_total    0
unemployment_rate_youth    28
dtype: int64
```

Overall Unemployment Trend (1991–2024)

The following line chart shows the unemployment rate trends in Pakistan over the last three decades.
It includes both the **total unemployment rate** and the **youth unemployment rate (ages 15–24)** to highlight differences between the general labor force and younger workers.

Observing these trends over time helps us:

- Identify long-term patterns.
- Spot significant changes due to economic events.
- Compare the unemployment burden between age groups.

```
plt.figure(figsize=(10,5))
sns.lineplot(x="year", y="unemployment_rate_total", data=df, marker="o", label="Total Unempl
sns.lineplot(x="year", y="unemployment_rate_youth", data=df, marker="o", label="Youth Unempl
plt.title("Pakistan: Unemployment Trends (1991–2024)")
plt.xlabel("Year")
plt.ylabel("Unemployment Rate (%)")
plt.legend()
plt.grid(True)
plt.show()
```

COVID-19 Impact on Unemployment

To understand the effect of the COVID-19 pandemic on Pakistan's labor market, we compare the **average unemployment rate** before 2020 (pre-pandemic) and from 2020 onward (post-pandemic).

Compare Pre- and Post-COVID Averages

```
pre_covid = df[df["year"] < 2020]["unemployment_rate_total"].mean()
post_covid = df[df["year"] >= 2020]["unemployment_rate_total"].mean()

print(f"Average Unemployment Pre-COVID: {pre_covid:.2f}%")
print(f"Average Unemployment Post-COVID: {post_covid:.2f}%")
```

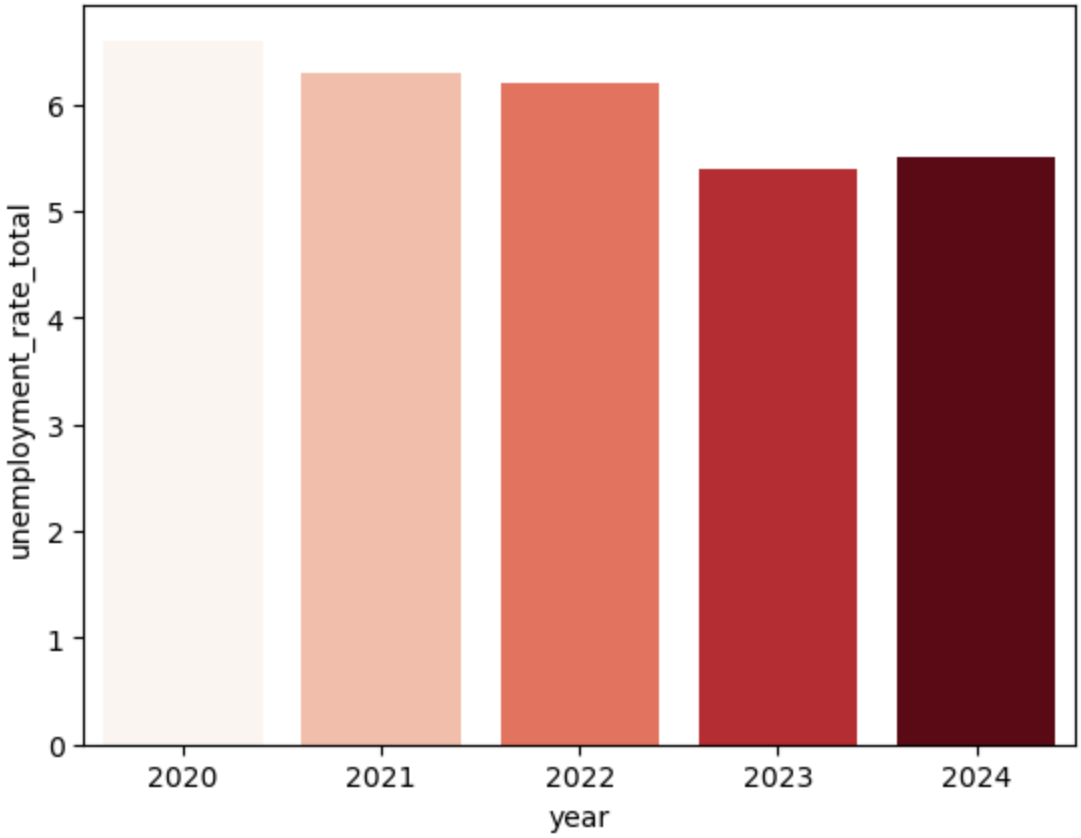
```
Average Unemployment Pre-COVID: 6.19%
Average Unemployment Post-COVID: 6.00%
```

Visualizing COVID-19 Years

While averages give us a summary, it's also useful to see the unemployment rates for each year during the pandemic period (2020–2024).
This helps in spotting the peak and the pace of recovery visually.

```
covid_years = df[df["year"] >= 2020]
sns.barplot(
    x="year",
    y="unemployment_rate_total",
    data=covid_years,
    hue="year",          # Use year as hue
    palette="Reds",
    legend=False         # Turn off extra legend
)
```

```
<Axes: xlabel='year', ylabel='unemployment_rate_total'>
```

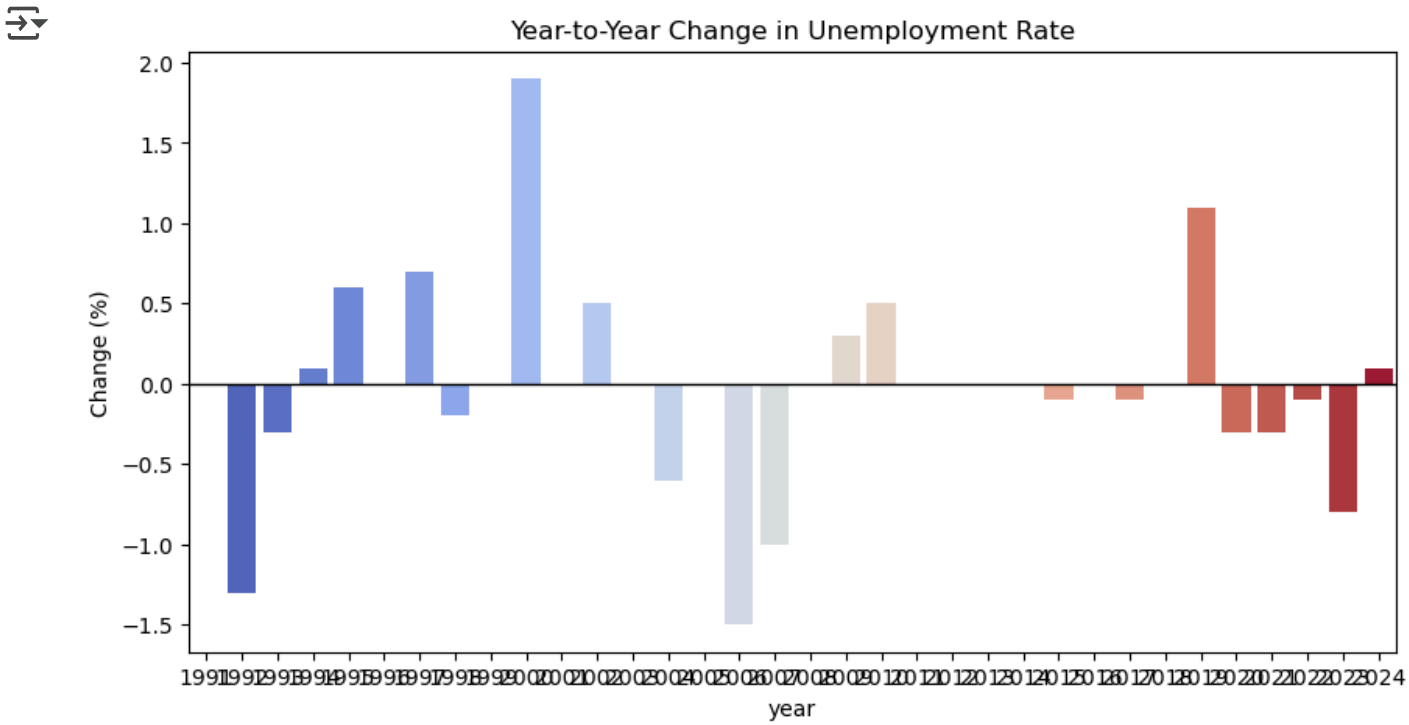


Year-to-Year Change in Unemployment Rate

This analysis calculates the difference in unemployment rate from one year to the next.
Positive values indicate an increase in unemployment,
while negative values show a decrease compared to the previous year.

```
df["change"] = df["unemployment_rate_total"].diff()
```

```
plt.figure(figsize=(10,5))
sns.barplot(x="year", y="change", data=df, hue="year", palette="coolwarm", legend=False)
plt.axhline(0, color="black", linewidth=1)
plt.title("Year-to-Year Change in Unemployment Rate")
plt.ylabel("Change (%)")
plt.show()
```



Key Findings

- **COVID-19 Impact:** The unemployment rate increased noticeably in 2020 compared to 2019, and remained elevated in 2021.
- **Recovery Signs:** From 2022 onwards, unemployment started to decline, but has not fully returned to pre-COVID levels.
- **Youth vs Total:** Youth unemployment (ages 15–24) remained consistently higher than the total rate in the available years.
- **Volatile Years:** The largest changes occurred during 2019–2021, coinciding with the pandemic.

Policy Implications

1. Targeted youth employment programs.
2. Rapid-response measures during economic crises.
3. Encourage investment in labor-intensive industries.
4. Regional tracking to identify and address hotspots.
5. More frequent and transparent labor force surveys.

Conclusion

This analysis shows how COVID-19 temporarily increased unemployment in Pakistan.
Youth unemployment remains a structural challenge, and sustained policy action is needed to ensure job growth and economic stability.

About Author

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